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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/667,575	09/22/2003	Thiemo Marx	PO-7791/LeA 36,167	9646
34947	7590	09/28/2007		
LANXESS CORPORATION 111 RIDC PARK WEST DRIVE PITTSBURGH, PA 15275-1112			EXAMINER VIJAYAKUMAR, KALLAMBELLA M	
			ART UNIT 1751	PAPER NUMBER
			MAIL DATE 09/28/2007	DELIVERY MODE PAPER

**Please find below and/or attached an Office communication concerning this application or proceeding.**

The time period for reply, if any, is set in the attached communication.

**Office Action Summary**

Application No.

10/667,575

Applicant(s)

MARX ET AL.

Examiner

Kallambella Vijayakumar

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

- 1) ☒ Responsive to communication(s) filed on 23 July 2007.
- 2a) ☐ This action is **FINAL**.                      2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

- 4) ☒ Claim(s) 1 and 3-14 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1, 3-14 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

**Application Papers**

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

**Priority under 35 U.S.C. § 119**

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All    b) ☐ Some \*    c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

**Attachment(s)**

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO/SB/08)  
Paper No(s)/Mail Date \_\_\_\_\_
- 4) ☐ Interview Summary (PTO-413)  
Paper No(s)/Mail Date. \_\_\_\_\_
- 5) ☐ Notice of Informal Patent Application
- 6) ☐ Other: \_\_\_\_\_

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***Detailed Action***

- A request for continued examination under 37 CFR 1.114, including the fee set forth in 37 CFR 1.17(e), was filed in this application after final rejection. Since this application is eligible for continued examination under 37 CFR 1.114, and the fee set forth in 37 CFR 1.17(e) has been timely paid, the finality of the previous Office action has been withdrawn pursuant to 37 CFR 1.114. Applicant's submission filed on 07/23/2007 has been entered.
- Claims 1 and 3-14 are currently pending with the application. New Claims 6-14 was added.

***Claim Rejections - 35 USC § 102***

***Claim Rejections - 35 USC § 103***

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(a) the invention was known or used by others in this country, or patented or described in a printed publication in this or a foreign country, before the invention thereof by the applicant for a patent.

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

(e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the

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invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

The factual inquiries set forth in *Graham v. John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966),

that are applied for establishing a background for determining obviousness under 35 U.S.C. 103(a) are summarized as follows:

1. Determining the scope and contents of the prior art.
2. Ascertaining the differences between the prior art and the claims at issue.
3. Resolving the level of ordinary skill in the pertinent art.
4. Considering objective evidence present in the application indicating obviousness or nonobviousness.

1. Claims 1, 3-5, 7, 9, 11 and 13 are rejected under 35 U.S.C. 102(b) as being anticipated by Takeda et al (US 6,200,680; PTO-892).

**Claim interpretation:** In the absence of a definition of "redispersible form" by the applicants, any composition that is stable and could be dispersed/redispersed/slurried by any means including dilution or mixing meet this limitation over the disclosure by the applicants wherein a gel-slurry/concentration of ZnO is diluted with a solvent mixture (See-Specification, Examples). With regard to the limitation of water and halogen-free in the claims, any composition without the intentional addition of water or a halogen compound/solvent will meet this limitation.

Takeda et al teach the composition comprising a 1-80 wt% ZnO particles with a particle size of 0.005–0.1 micron <5-100 nm> dispersed in aliphatic monohydric alcohols such methanol, ethanol, isopropyl alcohol, n-butanol, t-butyl alcohol, and further containing an amino-alcohol additive/dispersant containing a primary, secondary or tertiary amino group such as monoethanolamine or diethanolamine, and a method of making the composition by mixing the components (Abstract, CI-16, Ln 25-28; CI-20, Ln 34-40; CI-24, Ln 37-60). The prior art further teaches that the dispersions are used as such or as dispersion in a different solvent medium and the presence of aminoalcohol in the dispersion or the diluted dispersion would be inherent (CI-24, Ln 61-CI-25, Ln 13). With regard to the product by process limitation "redispersible form" in the claims 1 and 3, the examiner asserts that the prior art composition will be either same or substantially the same as that obtained by the redispersible-form in the instant claims,

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and when the reference teaches a product that appears to be the same as, the product set forth in a product-by-process claim although produced by a different process, the claim is not patentable. See *In re Marosi*, 710 F.2d 799, 218 USPQ 289 (Fed. Cir. 1983) And *In re Thorpe*, 777 F.2d 695, 227 USPQ 964 (Fed. Cir. 1985). See also MPEP §2113. The prior art does not teach the addition of a chloride or water in the composition that meets the limitation of a "water-free" and "halogen free" in the claims. With regard to claims 4-5, 11 and 13, the prior art teaches a coating composition and a molded article containing the ZnO dispersion (CI-11, Ln 15-40). All the limitations of the instant claims are met.

The reference is anticipatory.

2. Claims 1 and 3-14 are rejected under 35 U.S.C. 103(a) as obvious over Takeda et al in view of Womelsdroff et al (WO 00/50503).

Takeda et al teach the composition comprising a 1-80 wt% ZnO particles with a particle size of 0.005–0.1 micron <5-100 nm> dispersed in aliphatic monohydric alcohols such as methanol, ethanol, isopropyl alcohol, n-butanol, t-butyl alcohol, and further containing an amino-alcohol additive/dispersant containing a primary, secondary or tertiary amino group such as monoethanolamine or diethanolamine, and a method of making the composition by mixing the components (Abstract, CI-16, Ln 25-28; CI-20, Ln 34-40; CI-24, Ln 37-60). The prior art further teaches that the dispersions could be used as such or as a dispersion in a different solvent medium or formed into powder by removing the solvent and then dispersing the ZnO particles in a solvent such as alcohol, and the alcohols include monohydric alcohols such as methanol, ethanol, propanol and butanol (CI-24, Ln 61-CI-25, Ln 13). Neither water nor halogenated solvents are added in the composition meeting the limitation of water and halogen-free in the claims.

The prior art fails to teach a composition containing triethanolamine per the claims or the addition of aminoalcohol to the dispersion of dried ZnO particles in a solvent per claims 1, 3, 6, 8, and 14.

In the analogous art Womelsdorf teaches the benefit of adding triethanolamine to nano ZnO-dispersions in the solvents with the stabilization of ZnO by surface modifying the oxide particles with

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alkanolamines such as triethanolamine (US 6,710,091 English equivalent of WO and DE documents cited above; CI-5, Ln 19-21).

It would have been obvious to a person of ordinary skilled in the art to add the triethanolamine of Womelsdorf in to the dispersions of Takeda et al to benefit from stable homogeneous dispersions with reasonable expectation of success because the teachings are in the analogous art, and Takeda is concerned about forming homogeneous dispersions (CI-24, Ln 67).

With regard to the product by process limitation "redispersible form" in the claims 1,3 and 14, the examiner asserts that the prior art composition will be similar to that obtained by the redispersible-form in the instant claims, and when the reference teaches a product that appears to be the same as or an obvious variant of the product set forth in a product-by-process claim although produced by a different process, the claim is not patentable. See *In re Marosi*, 710 F.2d 799, 218 USPQ 289 (Fed. Cir. 1983) And *In re Thorpe*, 777 F.2d 695, 227 USPQ 964 (Fed. Cir. 1985). See also MPEP §2113.

With regard to claims 4-5, 10-11 and 12-13, the prior art teaches a coating composition and a molded article containing the ZnO dispersion (CI-11, Ln 15-40).

3. Claims 1 and 3-14 are rejected under 35 U.S.C. 103(a) as being obvious over Womelsdorf et al (WO 00/50503).

The US Patent 6,710,091 issued to Womelsdorf et al is being used as the English Translation of the WO 00/50503 in the present rejection.

The prior art teaches a dispersion/sol containing nanoparticles of ZnO with an average particle diameter of less than 15 nm formed by redispersing the ZnO gel in organic solvents and further containing surface modifying compound such as triethanolamine. The prior art teaches making the ZnO particles by precipitating it from Zn salts dissolved in methanol with KOH in methanol, removing the supernatant liquid, further washing the precipitate by reslurrying it in additional methanol and removing the supernatant liquid to obtain a wet gel containing ZnO in methanol, and followed by redispersing the wet gel in an organic solvent, wherein the dried gel had a solid content of 75.3 wt% i.e. 14.7% MeOH in the gel. (Abstract, Col-3, Ln 5-10; Col-5, Ln 10-21, 39-48, Col-5, Example-1, CI-6, Ln 10-15).

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The prior art fails to teach the addition of C2-C6 monoalcohol in making the ZnO precipitate per the claims 1, 3, 7, 9 and 14.

It would be obvious to a person of ordinary skilled in the art to substitute the methanol with ethanol or propanol or butanol as functional equivalents in making/washing of the ZnO gel with reasonable expectation of success, because of their low toxicity and these are homologs, and homologs (compounds differing regularly by the successive addition of the same chemical group, e.g., by -CH<sub>2</sub>- groups) are generally of sufficiently close structural similarity that there is a presumed expectation that such compounds possess similar properties. In re Wilder, 563 F.2d 457, 195 USPQ 426 (CCPA 1977), and an organic sol made by redispersion of such a gel will obviously contain a portion of corresponding alcohol used in the process that will meet the limitation of C2-C6 alcohols in the instant claim.

With regard to claims 4-5 and 10-13, the prior art further teaches using the ZnO in the matrix modification of the polymers, paints and coatings, and vulcanization of rubbers and lattices (C-5, Ln 45-48), and it would have been obvious to a person of ordinary skilled in the art to have used the composition in coating or molding of the plastics.

4. Claims 1, 3, 5-9 and 12-14 are rejected under 35 U.S.C. 103(a) as obvious over Ono et al (US 5,830,578).

Ono et al teach a resin film containing pigment dispersed therein and coating the film by from a composition comprising ultrafine pigments of with a particle size of 0.1 micron or less, a binder resin, solvents such as lower alcohols and cure agents such as triethanolamine and making the composition by mixing the components (Abstract; CI-3, Ln 38-50; CI-4, Ln 51-55; CI-7, Ln 14-43; CI-8, Ln 26-33, 53-58; CI-11, Ln 55-64).

The prior art is silent about the alcohols encompassed by the lower alcohols.

It would have been obvious to a person of ordinary skilled in the art that the lower alcohols in the composition of Ono encompasses butanol that is well known in the art as shown by Monroe that teaches the lower alcohols to include C1-C6 alcohols in forming oxide dispersions (US 5,728,184; CI-3, Ln 61-65).

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5. Claims 1, 3, 5-9 and 12-14 are rejected under 35 U.S.C. 103(a) as being obvious over Marx et al (US 6,699,316) in view of Womelsdorf (WO 00/50503).

Applicant cannot rely upon the foreign priority papers to overcome this rejection because a translation of said papers has not been made of record in accordance with 37 CFR 1.55. See MPEP § 201.15.

The applied reference has a common inventor with the instant application. Based upon the earlier effective U.S. filing date of the reference, it constitutes prior art only under 35 U.S.C. 102(e). This rejection under 35 U.S.C. 103(a) might be overcome by: (1) a showing under 37 CFR 1.132 that any invention disclosed but not claimed in the reference was derived from the inventor of this application and is thus not an invention "by another"; (2) a showing of a date of invention for the claimed subject matter of the application which corresponds to subject matter disclosed but not claimed in the reference, prior to the effective U.S. filing date of the reference under 37 CFR 1.131; or (3) an oath or declaration under 37 CFR 1.130 stating that the application and reference are currently owned by the same party and that the inventor named in the application is the prior inventor under 35 U.S.C. 104, together with a terminal disclaimer in accordance with 37 CFR 1.321(c). This rejection might also be overcome by showing that the reference is disqualified under 35 U.S.C. 103(c) as prior art in a rejection under 35 U.S.C. 103(a). See MPEP § 706.02(I)(1) and § 706.02(I)(2).

Marx et al teach the composition of a Nano-ZnO dispersion in butanol containing ZnO with a particle size of 1-100 nm. The prior art teaches forming the dispersion by slurring the ZnO in a suitable medium such as CH<sub>2</sub>Cl<sub>2</sub>/MeOH, removing the halogen content by distillation and admixing with a solvent such as butanol, whereby the dispersion medium is water and halogen free (CI-1, Ln 31-35, CI-1, Ln 65 – CI-2, Ln 8; Ln 25-30; CI-4, Ln 62 – CI-5, Ln 36). The prior art further teaches improving the dispersion of particles by homogenization and incorporating it in polymeric materials and coatings.

The prior art fails to teach the addition of stabilizer such as trietanolamine/aminoalcohols. However it discloses that the Nano-ZnO dispersions in organic solvents are stabilized with alkalomines per the teachings of Womelsdorf in DE-A 19907704 (CI-1, Ln 13-19).



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In the analogous art, Womelsdorf et al teach the stabilization of ZnO dispersion in solvents by surface modifying the oxide particles with alkanolamines such as triethanolamine (US 6,710,091 English equivalent of WO and DE documents cited above; CI-5, Ln 19-21).

It would have been obvious to a person of ordinary skilled in the art to add triethanolamine in the Nano-ZnO dispersion of Marx et al in butanol over the teachings of Womelsdorf to benefit from stable dispersions with reasonable expectation of success, because the prior art is concerned about improving the degree of dispersion of particles and pot life (CI-2, Ln 17-24; CI-5, Ln 22-24).

6. Claims 1, 3, 5-9 and 12-14 are rejected under 35 U.S.C. 103(a) as being obvious over Idemitsu et al (JP 05-262,624; PTOL-1449) in view of Womelsdorf (WO 00/50503).

Idemitsu teaches a coating composition containing a mixture of lower aliphatic alcohol such as ethanol or butanol, Zn-n-propoxide and/or Zn-acetate and an ethanolamine such as triethanolamine.

The prior art is silent about the ZnO nanoparticles in the composition.

The alcohols such as ethanol contain small amounts of water due to complete miscibility with water, their hygroscopic nature and formation of azeotropes with water during distillation that can obviously hydrolyse the organometallic salts of Zn to nanoparticles of ZnO in the coating composition of Idemitsu as evidenced by Womelsdorf et al that discloses the formation of such nanoparticles of ZnO by the hydrolysis of Zn-acetate in alcoholic solutions (Womelsdorf: US 6,710,091 English equivalent of WO and DE documents cited above; CI-2, Ln 57-65).

### ***Response to Arguments***

Applicant's arguments filed 07/23/2007 have been fully considered and it overcomes the prior art by Hagiwara et al (US 5,672,427). Applicant's argument that Takeda does not teach redispersed ZnO particles in an alcohol and an additive and it is not a product-by-process limitation has been addressed under the "Claim Interpretation" in Rejection-1 (Res. Pg-5, Ln 4-10). The benefits of applicant's composition are noted and they are not the limitation of the claims (Res, Pg-5, Para-2). With regard to the

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argument that Womelsdorf does not teach the addition of amino alcohol with a water-free system, the prior art teaches adding surface modifying agents to organic solvents or diols that are soluble in water and one of ordinary skilled in the art would be motivated use other water soluble polar solvents such as common alcohols (Res, Pg-7, Para-2). With regard to the argument that the prior art does not teach the addition of C2-C6 monoalcohols, the prior art teaches washing the ZnO with methanol and the resulting gel had a solid content of 75.3 wt% i.e. 14.7% MeOH in the gel (Cl-6, Ln 10-15). A person of ordinary skilled would be motivated to use other alcohols including common propanol and butanols as functional equivalents in the process of Womelsdorf, and the resulting composition obviously contains the residual alcohol in the composition (Res, Pg-7, Para-3).

For the reasons set forth above, applicant's fail to distinguish their composition and method over the prior art.

### ***Conclusion***

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Kallambella Vijayakumar whose telephone number is 571-272-1324. The examiner can normally be reached on 8.30-6.00 Mon-Thu, 8.30-5.00 Alt Fri.

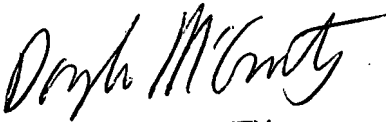
If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Douglas McGinty can be reached on 571-272-1029. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

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Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/KMV/

September 21, 2007.

  
DOUGLAS MCGINTY  
SUPERVISORY PATENT EXAMINER  
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